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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,154	02/27/2004	Dennis S. Greywall	35-19	9017

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EXAMINER	
GODFREY, KEITH JOSEPH	
ART UNIT	**PAPER NUMBER**
1791	

MAIL DATE	DELIVERY MODE
10/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,154	GREYWALL ET AL.	
	Examiner	Art Unit	
	Keith J. Godfrey	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21 and 28-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The previous Office action rejection is withdrawn in view of the Pre-Appeal Brief Conference Decision that was mailed 07/02/2007.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-21, and 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Newman (US 6299812) in view of Krins et al. (US 6106745).

As to claims 1, 19, and 28, Newman (US 6299812), hereinafter "Newman", teaches a method of melt spinning including:

-mixing carbon fibers (*carbon molecules*) with a matrix material (*curable liquid*) wherein the fibers are randomly oriented in the deformable mixture (*aligning particles down a tapering tube*) (Abstract and Fig. 1 and col. 2, lines 57-63). It can be seen from Fig. 1 that alignment begins at the beginning (*first end*) of hopper, element **14**, (*tapering tube*).

-heating the fiber mixture, which has been mixed in a solvent, such as toluene, to evaporate (*dissipate volatile elements*) (col. 5, lines 1-8).

-process transformation of the fibers into a rope-like structure (*twisting*) (col. 4, lines 17-23). It is noted that Newman does not expressly bridge the effect of twisting with an increase of density in the fiber, however it would be known to those skilled in the art that twisting would have an intrinsic density increase.

-subjecting the fibers to a pyrolysis (*sintering*) procedure in an oven to convert the matrix mixture into a pure carbon structure (col. 6, lines 61-67 and col. 7, lines 1-8).

Newman does not teach curing the mixture near the end of the tapering tube.

Krins et al. (US 6106745), hereinafter "Krins", teaches a method of melt spinning including curing a formed thread (*fiber*) by UV radiation. Krins further teaches that the specific curing time after forming the desired refractive index (*mixing with curable liquid*) will generally overlap, since the rate of curing is of the same order of magnitude (seconds) as the rate of diffusion. The man skilled in the art will be able to determine, without undue experimentation, and using his due skill with regard to curing over relatively large distances, the point in time at which curing should commence so as to obtain the desired refractive index profile (col. 9, lines 12-40). Hence it is submitted that the place along the tapering tube where curing begins is a result effective-variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use routine experimentation to determine an optimum location to begin curing the mixture the process of Newman because Krins specifically teaches that the location of initial curing depends on the desired refractive index, and as such teaching that the location of curing the mixture with respect to the tapering tube is a result-effective variable.

Because both of the references are concerned with a similar technical field, namely that of polymer coated fiber extudates, one would have a reasonable expectation of success from the combination.

As to claim 2, Newman teaches dispersing fibrous carbon nanotubes in a liquid epoxide base (*curable liquid*) resin by mechanical mixing to form a mixture (col. 5, lines 9-18).

As to claims 3 and 15, Newman does not teach curing in the presence of UV light.

Krins teaches curing polymer coated fibers by UV light (col. 9, lines 12-40).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use UV light to cure the polymer material (*curable liquid*), as taught be Krins, in the method of Newman because UV light also sanitizes the extruded fiber.

As to claim 4, Newman teaches heating the fiber mixture, which has been mixed in a solvent, such as toluene, to evaporate (*dissipate volatile elements*) (col. 5, lines 1-8).

As to claims 5-6, Newman teaches a process transformation of the fibers into a rope-like structure (*twisting*) (col. 4, lines 17-23). It is noted that Newman does not expressly bridge the effect of twisting with an increase of density in the fiber, however it would be known to those skilled in the art that twisting would have an intrinsic density increase.

As to claims 7-8, Newman teaches subjecting the fibers to a pyrolysis (*sintering*) procedure in an oven to convert the matrix mixture into a pure carbon structure (col. 6, lines 61-67 and col. 7, lines 1-8).

As to claims 9 and 29, Newman teaches the matrix material can be a metal, effectively cladding the carbon fibers (col. 3, lines 16-31).

As to claim 10, Newman teaches spooling the extrudate fiber (col. 6, lines 48-53).

As to claim 11, Newman teaches that the matrix material (*curable liquid*) and properties of deformation including stretching and shearing depend on the materials used (col. 3, lines 16-38). Hence it is submitted that the curable liquid mixture is a result-effective variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use routine experimentation to determine an optimum curable liquid mixture in the process of Newman because Newman specifically teaches that the deformation properties of the matrix material (*curable liquid*) depends on materials used, and as such teaching the curable liquid is a result-effective variable.

As to claims 12-13, 20-21, and 30-31, Newman teaches that examples of fibers can be fibrous carbon fibers (*carbon fibrils*) and carbon nanotubes (col. 2, lines 57-62).

As to claims 16-18, Newman does not teach curing the mixture within, nor after, the tapering tube.

Krins et al. (US 6106745), hereinafter "Krins", teaches a method of melt spinning including curing a formed thread (*fiber*) by UV radiation. Krins further teaches that the

specific curing time after forming the desired refractive index (*mixing with curable liquid*) will generally overlap, since the rate of curing is of the same order of magnitude (seconds) as the rate of diffusion. The man skilled in the art will be able to determine, without undue experimentation, and using his due skill with regard to curing over relatively large distances, the point in time at which curing should commence so as to obtain the desired refractive index profile (col. 9, lines 12-40). Hence it is submitted that the place along the tapering tube where curing begins is a result effective-variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use routine experimentation to determine an optimum location to begin curing the mixture the process of Newman because Krins specifically teaches that the location of initial curing depends on the desired refractive index, and as such teaching that the location of curing the mixture with respect to the tapering tube is a result-effective variable. Because both of the references are concerned with a similar technical field, namely that of polymer coated fiber extudates, one would have a reasonable expectation of success from the combination.

As to claim 17, it is submitted that intrinsic with effectively performing curing at least in part while mixture remains within said tapering tube, as taught by Krins, a portion of the tube be at least partially translucent to UV light. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a tapering tube which allows UV radiation to pass through for means of curing, implicitly

taught by Krins, in the method of Newman to maintain structural integrity after exiting the tapering tube.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Keith J. Godfrey whose telephone number is 571-272-6391. The examiner can normally be reached on 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina A. Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

kjg

CHRISTINA JOHNSON
SUPERVISORY PATENT EXAMINER